

## CLAIMS

- 1           1.    A primary alkaline battery, comprising:  
2           a cathode comprising a cathode active material and carbon fibers;  
3           an anode;  
4           a separator; and  
5           an alkaline electrolyte.
  
- 1           2.    The battery of claim 1, wherein the cathode comprises less than about 5% of  
2           carbon fibers by weight.
  
- 1           3.    The battery of claim 1, wherein the cathode comprises less than about 4% of  
2           carbon fibers by weight.
  
- 1           4.    The battery of claim 1, wherein the cathode comprises less than about 3% of  
2           carbon fibers by weight.
  
- 1           5.    The battery of claim 1, wherein the cathode comprises less than about 2% of  
2           carbon fibers by weight.
  
- 1           6.    The battery of claim 1, wherein the cathode comprises between about 1% and  
2           about 5% of carbon fibers by weight.
  
- 1           7.    The battery of claim 1, wherein the cathode comprises between about 2% and  
2           about 3% of carbon fibers by weight.
  
- 1           8.    The battery of claim 1, wherein the cathode active material comprises  
2           manganese dioxide.
  
- 1           9.    The battery of claim 1, wherein the cathode comprises greater than about 86%  
2           of cathode active material by weight.

1           10. The battery of claim 1, wherein the cathode comprises greater than about 88%  
2 of cathode active material by weight.

1           11. The battery of claim 1, wherein the cathode comprises greater than about 90%  
2 of cathode active material by weight.

1           12. The battery of claim 1, wherein the cathode comprises greater than about 92%  
2 of cathode active material by weight.

1           13. The battery of claim 1, wherein the carbon fibers have a diameter less than  
2 about 250 nanometers.

1           14. The battery of claim 1, wherein the carbon fibers have a diameter between about  
2 60 nanometers and about 100 nanometers.

1           15. The battery of claim 1, wherein the carbon fibers have a diameter less than  
2 about 60 nanometers.

1           16. The battery of claim 1, wherein the carbon fibers have been heat treated.

1           17. The battery of claim 16, wherein the carbon fibers have been heat treated at a  
2 temperature greater than about 2000 °C.

1           18. The battery claim 16, wherein the carbon fibers have been heated treated at a  
2 temperature between about 2600 °C and about 3100 °C.

1           19. The battery of claim 1, wherein the carbon fibers have a length less than about 2  
2 x 10<sup>5</sup> nanometers.

1           20. The battery of claim 1, wherein the carbon fibers have a length between about  
2 500 nanometers and about 200,000 nanometers.

1           21. The battery of claim 1, wherein the carbon fibers have a length between about  
2           70,000 nanometers and about 100,000 nanometers.

1           22. The battery of claim 1, wherein the carbon fibers comprise between about 1 and  
2           about 500 layers of graphite.

1           23. The battery of claim 22, wherein the carbon fibers comprise between about 40  
2           and about 100 layers of graphite.

1           24. The battery of claim 1, wherein the carbon fibers have an external surface area  
2           between about  $10\text{m}^2/\text{g}$  and about  $50\text{m}^2/\text{g}$ .

1           25. The battery of claim 1, wherein the carbon fibers have a surface energy between  
2           about  $50\text{mJ}/\text{m}^2$  and about  $300\text{mJ}/\text{m}^2$ .

1           26. The battery of claim 1, wherein the carbon fibers have a graphitic index of less  
2           than about 85%.

1           27. The battery of claim 1, wherein the carbon fibers have a length equal to or  
2           greater than an average particle size of the cathode active material.

1           28. The battery of claim 1, wherein the cathode further comprises a surfactant.

1           29. The battery of claim 28, wherein the surfactant is selected from a group  
2           consisting of polyvinyl alcohol, ethylene-vinyl alcohol, and polyvinylbutyrol.

1           30. The battery of claim 1, wherein the anode comprises zinc as an anode active  
2           material.

1           31. A primary alkaline battery, comprising:  
2           a cathode comprising manganese dioxide and a heat-treated carbon material having a  
3           diameter less than about 250 nanometers;  
4           an anode;

5           a separator; and  
6           an alkaline electrolyte.

1           32. The battery of claim 31, wherein the cathode comprises between about 1% and  
2           about 5% of carbon fibers by weight.

1           33. The battery of claim 31, wherein the cathode comprises between about 2% and  
2           about 3% of carbon fibers by weight.

1           34. The battery of claim 31, wherein the cathode has an electrical conductivity at  
2           least 3 times greater than a cathode having about 6% of graphite.